City of Los Altos
Traffic Calming Toolkit

Prepared by the Los Altos Traffic Commission

Version 0.4
10/17/08

Table of Contents

Purpose

The purpose of this Traffic Calming Toolkit is to document and describe the traffic calming measures and devices that are currently approved by the City of Los Altos for traffic calming on Los Altos streets. The intention is to provide a high level overview of approved tools for use in Neighborhood Traffic Management Programs (NTMPs) and other traffic related projects. With input from residents, city staff can assemble these tools into effective traffic calming solutions that meet residents' needs.

The immediate purpose of traffic calming is to reduce the speed and volume of traffic. Reductions in traffic speed and volume result in the following benefits for Los Altos residents:

- Providing a safer environment for bicyclists, pedestrians, and children
- Improving livability and aesthetics of neighborhood streets
- Reducing accidents

Selection of Traffic Calming Devices

The Traffic Calming Toolkit includes a variety of devices that change the physical environment. Each situation is different and selected measures must be appropriate for that specific location. Before committing to any type of measure in response to a resident or neighborhood request, city staff will research the issue and quantify the problem through data collection and observation. All factors and conditions that may be contributing to the problem need to be reviewed and evaluated before any type of measure can be recommended. For example, to reduce speeds in a neighborhood, residents may want to consider a speed hump or speed table to slow down traffic if increased police enforcement is either not available or not effective or if a radar speed sign is not desired or effective.

It should also be noted that traffic calming can be implemented as a spot treatment or as an area-wide treatment. A spot treatment investigates a small area (like a single street) and improvements are implemented based on data from that locale, while an area-wide treatment looks at a large area (multiple streets in a neighborhood) at once and improvements are implemented based on the data from the entire area. Los Altos NTMP projects can be for either a single street or multiple streets.

The issues, advantages, and disadvantages associated with each device or combination of devices help identify the most appropriate and acceptable device(s) to address a traffic problem. The following are desired objectives when choosing a device:

- Addresses the problem in the most efficient and cost effective way possible
- Minimizes impact on adjacent streets
- Is consistent with neighborhood character
- Preserves Fire and Emergency Medical response criteria
- Addresses bicycle and pedestrian safety
- Addresses safety issues related to nearby schools
- Accommodates the dimensions of the street (Ex., a traffic circle can only be built in an intersection that is large enough for it; maintain minimum travel lane widths)
- Follows the guidelines of the Manual on Uniform Traffic Control Devices (MUTCD)
- Is consistent with Caltrans Design Guidelines

In addition, the attributes of Los Altos local streets must be taken into account when selecting traffic calming devices, such as lack of sidewalks and bicycle lanes and minimum street lighting.

Sometimes, the most effective traffic management programs use a variety of traffic calming tools as many of the devices complement each other. For instance, speed humps and chokers can be used effectively together, as can mini-traffic circles and curb extensions. Center median islands and chokers are often installed as a set. Raised crosswalks and curb extensions work well together. Many other combinations of traffic management devices can be effective.

Traffic Calming Measures and Devices

Traffic calming measures and devices fall under one of the following three "E" categories:

Education (Informational)
Educational measures and devices are intended to increase driver's awareness of surroundings and influence driver behavior without physical changes to the roadway. Examples of educational measures and devices include neighborhood traffic safety campaigns, radar speed display units, sign installation, and pavement marking changes. Because these measures are not self-enforcing, they can have limited effectiveness and usually need to be supplemented with other traffic calming measures.

Enforcement
Targeted police enforcement is intended to influence driver behavior without physical changes to the roadway. Because the police typically have limited resources, targeted enforcement is often not a long term solution and needs to be supplemented with self-enforcing devices.

Engineering
Engineering measures are self-enforcing devices installed on roadways to influence driver behavior. These self-enforcing devices can further be classified by the desired result one hopes to achieve.

- Devices whose primary purpose is to slow traffic speed and address safety concerns and quality of life include roadway narrowings such as chokers and bulb-outs, vertical deflections such as speed humps and raised crosswalks, and horizontal deflections such as chicanes, mini-traffic circles and modern roundabouts. These devices may be appropriate for both local and collector streets.
- Devices whose primary purpose is to reduce traffic volumes and discourage cut-through traffic from using residential streets include diverting and restrictive measures such as partial and full road closures, median barriers, and forced turn lanes. By their nature, these devices are used on local, residential streets.

The traffic calming devices described in this toolkit are listed in the tables below by the issue they address:

- Speeding
- Traffic volume
- Vehicle collisions
- Pedestrian and bicycle safety

Some devices address more than one issue and are therefore listed in more than one table. The name of each device in the tables below is a link to a data sheet with more information about each device; any drawings, photos, and sketches in this document are for purposes of illustrating the concepts involved; they do not constitute engineering design recommended for any specific location in Los Altos. The speed, volume, and vehicle collision impacts for each device are listed separately in a table in the Appendix.

The relative cost in the table are defined as follows and the cost[1] can vary depending on the materials used, current market prices, and other factors such as irrigated landscaping:

- Low (less than $10K)
- Medium ($10K-$50K)
- High (over $50K)

Table 1: Speeding

Traffic Calming Device	Other Issue(s) Addressed by Device	Location	Relative Cost	Approved[2] for use in Los Altos	Examples in or near Los Altos
Bulb-outs (Neckdown, Curb Extension, Bump-out)	Pedestrian and Bicycle Safety	Local street, local collector @intersection	Medium to High	Approved	Main St. @ Third St **Berry Ave.**
Chicanes (Serpentines)		Local street @mid-block	Medium to High	Approved [3]	N. Clark between Almond and Jardin
Chokers (Pinch Points)		Local street @mid-block	Medium to High	Approved	Juanita Way
Medians and Median Islands (Center Island Narrowing)	Traffic Volume Pedestrian and Bicycle Safety	Arterial Collector Local collector	Medium to High	Approved	El Monte between S. Clark and Santa Barbara. **Cuesta @ Springer.** S. Clark @ El Monte **Springer @ Berry.**
Mini-Traffic Circles	Vehicle Collisions	Local street @intersection	Medium to High	Approved	N. Clark @ Jardin
Mounds	Pedestrian and Bicycle Safety	Collector Local collector Local street	Low to Medium	Approved [4]	El Monte between S. Clark and Santa Barbara
Radar Speed Signs		Arterial Collector Local collector	Medium	Approved	Miramonte near Stanley **Los Altos Ave. near Santa Rita School**
Raised Crosswalks (Speed Tables)	Pedestrian and Bicycle Safety	Collector Local collector	Medium to High	Approved	El Monte behind Almond School **Berry Ave. in front of Loyola School**
Roadway Narrowings	Pedestrian and Bicycle Safety	Collector Local collector	Low to High	Approved	Berry Ave (pathway, landscaping)[5] **Springer Rd (striping, bike lane)**
Roundabouts [6]	Traffic Flow Vehicle Collisions	Arterial @intersection Collectors @intersection	High		Cristo Rey Dr., Cupertino
Speed Humps		Local street @mid-block	Low	Approved[7]	N. Clark in Mountain View **Presidio Dr., Cupertino near Monta Vista High School**

Table 2: Traffic Volume

Traffic Calming Device	Other Issue(s) Addressed by Device	Location	Relative Cost	Approved[2] for use in Los Altos	Examples in or near Los Altos
Forced-Turn Channelization	Speeding at intersection	Local street	Medium to High	Approved	Jay Street @ El Monte
Full Street Closures	Speeding	Local street	Medium to High	Approved	Maple Lane between Dolores & Loraine
Medians and Median Islands (Center Island Narrowing)	Traffic Volume Pedestrian and Bicycle Safety	Arterial Collector Local collector	Medium to High	Approved	El Monte between S. Clark and Santa Barbara. **Cuesta @ Springer.** S. Clark @ El Monte **Springer @ Berry** Fremont Ave between Grant and Fallen Leaf Lane
Partial Street Closures	Traffic Volume	Local street	Medium to High		
Raised Crosswalks (Speed Tables)	Speeding Pedestrian and Bicycle Safety	Collector Local collector	Medium to High	Approved	El Monte behind Almond School **Berry in front of Loyola School**
Turn Restriction Signs		Arterial Collector	Low	Approved [8]	Northbound Miramonte @ Eastwood

Table 3: Vehicle Collisions

Traffic Calming Device	Other Issue(s) Addressed by Device	Location	Relative Cost	Approved[2] for use in Los Altos	Examples in or near Los Altos
Mini-Traffic Circles	Speeding	Local street @intersection	Medium to High	Approved	N. Clark @ Jardin
Roundabouts [6]	Speeding	Arterial @intersection Collectors @intersection	High		Cristo Rey Dr., Cupertino

Table 4: Pedestrian and Bicycle Safety

Traffic Calming Device	Other Issue(s) Addressed by Device	Location	Relative Cost	Approved[2] for use in Los Altos	Examples in or near Los Altos
Bulb-outs	Speeding	Local street, local collector @intersection	Medium to High	Approved	Main St. @ Third St **Berry Ave.**
Class I Bikeway (bike path, multi-use trail)		Local collector, collector, arterial,	High	Approved	Hetch Hetchy pathway connecting Los Altos Ave to Palo Alto. **Berry Avenue pathway.**
Class II Bikeway (bike lane)		Local street, local collector, collector, arterial	Low	Approved	San Antonio Road **El Monte Avenue** Springer Road **Almond Avenue**
Class III Bikeway (bike route)		Local street, local collector, collector, arterial	Low	Approved	Los Altos Ave **Covington Road** Route parallel to Foothill Expressway
Flashing Pedestrian Warning Lights		Arterial @crosswalk	High	Approved	San Antonio between Foothill Expr and El Camino
Medians and Median Islands (Center Island Narrowing)	Traffic Volume Pedestrian and Bicycle Safety	Arterial Collector Local collector	Medium to High	Approved	El Monte between S. Clark and Santa Barbara. **Cuesta @ Springer.** S. Clark @ El Monte **Springer @ Berry**
Mounds	Speeding	Collector Local collector Local street	Low to Medium	Approved [4]	El Monte between S. Clark and Santa Barbara
Raised Crosswalks (Speed Tables)	Speeding	Collector Local collector	Medium to High	Approved	El Monte behind Almond School **Berry in front of Loyola School**
Roadway Narrowings	Speeding	Collector Local collector	Low to High	Approved	Berry Ave (pathway, landscaping)[5] **Springer Rd (striping, bike lane)**
Sidewalks		Local street, local collector, collector, arterial	High	Approved	San Antonio **Almond Ave.**

Pedestrian and Bicycle Safety

Sidewalks and bike lanes are important elements for pedestrian and bicycle safety. Pedestrians and cyclists must frequently share the roadway with vehicles.

Pedestrian Safety and Sidewalks

The streets of Los Altos were laid out before the city's 1952 incorporation and tend to be narrow and lacking continuous sidewalks, bike lanes, and controlled crosswalks.

Sidewalks are generally found only in the city's commercial districts and on frontage streets where schools are located. There is no Pedestrian Master Plan for the city though a project to develop such a plan is scheduled for the 2010 - 2011 time frame. The standard width for a Los Altos sidewalk in a non-commercial environment is four feet. Sidewalks have been built using Portland Concrete Cement (PCC) and Asphalt Cement (AC) though PCC is used for commercial environments.

Bicycle Safety and Bikeways

Bicycle accommodations are typical for a small residential community. The Los Altos' Bicycle Pedestrian Advisory Committee (BPAC) developed a Bicycle Transportation Plan that was approved by Council in February 2002. The purpose of the plan is to foster and support the use of bicycle commuting, utility and recreational purposes by citizens of all ages and skill levels. The City is making steady progress upgrading its bicycle facilities based upon this plan.

Bikeways are described by Caltrans in Chapter 1000 of the Highway Design Manual as being one of three basic types: Class I Bikeway (multi-use trail), Class II Bikeway (bike lane), and Class III Bikeway (bike route). Refer to the fact sheets for more details.

Glossary

- *85th percentile speed*: The speed at which 85 percent of the drivers operate at or below.
- *Arterials*: Streets that primarily serve through traffic such as San Antonio Road, Foothill Expressway, and S. El Monte Av between Foothill Expressway and the Town of Los Altos Hills city limit.
- *Collectors*: Streets that provide access and traffic circulation within residential and non-residential areas such as Almond Av., Cuesta Av., El Monte Av., Springer Rd., Miramonte Av., Grant Rd., and Fremont Av.
- *Horizontal Deflection*: Refers to traffic calming measures that hinder the driver's ability to drive in a straight line by creating a horizontal shift in the roadway or that narrow the width of the travel lane.
- *Institute of Transportation Engineers (ITE)*: An international educational and scientific association of transportation professionals.
- *Local Collectors*: Streets that distribute traffic within a neighborhood or adjacent neighborhoods such as Los Altos Av. and Covington Rd.
- *Local Streets*: Streets that provide direct access to abutting residential properties as their primary function. The majority of Los Altos streets are classified as local streets.[9]
- *Neighborhood Traffic Management Program (NTMP)*: The City of Los Alto's primary program for calming traffic on local streets only.[10]
- *Traffic Calming*: The term "traffic calming" is defined differently throughout the United States and the world. The ITE defines traffic calming as follows:
  > *"Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver driver behavior and improve conditions for non-motorized street users."[11]*
- *Vertical Deflection*: refers to traffic calming measures that create a change in the height of the roadway (Ex., speed hump)

References

- Circulation Element, Los Altos General Plan - http://www.ci.losaltos.ca.us/planning/generalplan/documents/CirculationElement.pdf
- City of Alameda, CA Traffic Calming toolkit - http://www.ci.alameda.ca.us/publicworks/
- City of Alexandria, VA Neighborhood Traffic Calming Program Guide- June 2003, http://alexandriava.gov/uploadedFiles/tes/info/NTCP%20Guide.pdf
- City of Arlington, VA Neighborhood Traffic Program - http://www.arlingtonva.us/Departments/EnvironmentalServices/dot/planning/ntc/guide/page60909.pdf
- City of Bellingham, WA Neighborhood Traffic Safety Program (NTSP) - http://www.cob.org/documents/pw/transportation/2008-ntsp.pdf
- City of Concord, New Hampshire Traffic Management Program September 2005, http://www.ci.concord.nh.us/planning/trafficmanagementprogram/tc adopted plan.pdf
- City of Los Altos NTMP - http://www.ci.los-altos.ca.us/publicworks/ntmp.html
- City of Mountain View, CA NTMP - http://www.ci.mtnview.ca.us/civica/filebank/blobdload.asp?BlobID=2214
- City of Palo Alto Neighborhood Traffic Calming Program - http://www.cityofpaloalto.org/knowzone/city_projects/streets_and_transportation/neighborhood_traffic_calming_program.asp
- City of Rancho Cordova, CA NTMP - http://www.cityofranchocordova.org/Modules/ShowDocument.aspx?documentid=1782 http://www.cityofranchocordova.org/Index.aspx?page=138
- City of Saratoga, CA NTMP - www.saratoga.ca.us/pdf/saratogantmp.PDF
- City of San Jose Traffic Calming Toolkit -- http://www.sanjoseca.gov/transportation/forms/toolkit.pdf http://www.sanjoseca.gov/transportation/traffic_calming.htm
- "ITE Traffic Calming Definition," ITE Journal, Vol. 67, July 1997
- Manual on Uniform Traffic Control Devices - http://mutcd.fhwa.dot.gov/
- Streets and Sidewalks, People and Cars - The Citizens' Guide to Traffic Calming by Dan Burden.
- Traffic Calming: State of the Practice ITE, Ewing, August 1999, ISBN: 0-935403-36-1
- VTA Pedestrian Technical Guidelines, 2003 - http://www.community-design.com/projects/region/VTA%20PeD%20Guidelines.pdf

End Notes

[1] The Bicycle-Cost Analysis of Bicycle Facilities web site at http://www.bicyclinginfo.org/bikecost can be used to get a rough cost estimate for bicycle safety related devices.
[2] Approved by City Council in June 2004. See staff memo titled "Traffic Calming Design Concepts and Standards" and dated 6/10/2004.
[3] Approved by City Council as part of NTMP project on N. Clark between Almond and Jardin.
[4] Not considered or approved in Los Altos for reducing turning radii at intersections
[5] Approved by City Council as part of Safe Routes to School project on Berry Ave near Loyola Elementary
[6] Roundabouts has been discussed for use in Los Altos at the intersection of Springer and Berry in the past but never implemented.
[7] Approved by City Council at 9/11/2007 council meeting. See meeting minutes at http://www.ci.los-altos.ca.us/uploads/4998/09-11-07.pdf (item 11 on pp.3-4)
[8] Approved by City Council as part of NTMP project on Eastwood between Convington and Miramonte
[9] Circulation Element, Los Altos General Plan
[10] City of Los Altos NTMP
[11] ITE Traffic Calming Definition